

# **NEPC Review: Systemwide and Intervention-Specific Effects of Denver Public Schools' Portfolio District Strategy on Individual Student Achievement (Center for Education Policy Analysis, University of Colorado Denver, September 2024)**



**Reviewed by:**

Robert Shand  
American University

November 2024

**National Education Policy Center**

School of Education  
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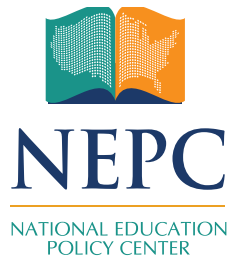
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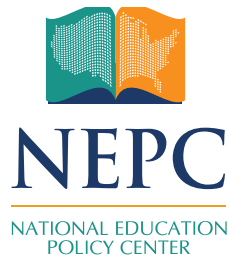
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## Summary

The Center for Education Policy Analysis (CEPA) at the University of Colorado Denver recently published a report that attempts to assess the effect of a “portfolio district strategy” on student performance in the Denver Public Schools. This report addressed criticism of a previous CEPA report on Denver’s reform strategy, including that it misattributed academic gains to the portfolio reform by inadequately addressing possible alternative explanations, especially student demographics that had changed during the reform period. While the new report does convincingly demonstrate that the gains are not significantly due to changing demographics, it fails to address other critiques of the prior study, including (1) that the portfolio model was undertheorized, with unclear mechanisms of action and insufficient attention to potential drawbacks; and (2) that circumstances, events, and resources besides the portfolio reform and student demographics were changing concurrently with the reform. Additionally, the report’s sweeping conclusion—that Denver’s reform is the most effective in U.S. history—is unsupported. The improved outcomes in Denver during this time period are impressive, but the authors seem overly determined to cite a package of favored reforms as the cause. Therefore, although the new report provides some additional suggestive evidence in support of the portfolio reform, its conclusions are exaggerated in both magnitude and certainty. Further study is needed before policy implications become clear.



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## I. Introduction

Many school districts, including the Denver Public Schools (DPS), have pursued a portfolio approach to managing local schools in an effort to “fundamentally change the culture and structure of public education.”<sup>1</sup> In contrast with the traditional and still common approach in which a single entity—usually a local school board—both oversees and operates a system of schools, the central tenet of the portfolio reform is to separate the oversight of school governance by the school board from direct school operations.<sup>2</sup>

Under a portfolio approach, local school districts operate a centralized marketplace in which parents and students can choose between traditional district-run schools, magnet or innovation schools, and charter schools. They all share a common accountability framework to provide information to the district and parents and potentially lead to rewards or sanctions for high- and low-performing schools. Beyond that, individual schools have substantial autonomy over budget, curriculum, and staffing, ostensibly to encourage innovation.<sup>3</sup>

A 2022 report<sup>4</sup> released by the Center for Education Policy Analysis at the School of Public Affairs at the University of Colorado, Denver (hereafter, “the Center”), attempted to analyze the effects of these changes on students in Denver by comparing aggregated results in the district to those in similar comparison school districts in Colorado over 15 years. My review<sup>5</sup> of that report noted that while it provided evidence for significant improvements in student outcomes in Denver compared with other districts in Colorado, attributing those gains to the portfolio reform was premature for several reasons. Not only was the portfolio model un-

dertheorized, with unclear mechanisms of action and sufficient attention to potential downsides, but the report failed to account for alternative explanations for student performance. These included other co-occurring reforms (such as changes in leadership, funding, class size, and curriculum) and changes in Denver's student demographics.

In September 2024, the Center released a follow-up report, *Systemwide and Intervention-Specific Effects of Denver Public Schools' Portfolio District Strategy on Individual Student Achievement*,<sup>6</sup> by Parker Baxter, Anna Nicotera, David Stuit, Margot Plotz, Todd Ely, and Paul Teske. This second report addresses some of the above critiques by reexamining similar questions using individual student-level data from Denver and nearby comparison districts between 2004-2005 and 2018-2019. By employing statistical methods that track relative changes in learning outcomes for individual students over time, as well as examining individual students who experienced specific elements of the portfolio reform, the report concludes that there is strong evidence linking student learning gains in Denver to the portfolio reform.

## II. Findings and Conclusions of the Report

The report offers three sets of findings:

First, as compared with matched comparison students in 11 geographically proximate districts in Colorado who were not exposed to portfolio reform, students in Denver experienced gains in test scores. Specifically, gains in fourth through eighth grade test scores started small, but then grew to about 0.2 standard deviations per year in math and 0.3 standard deviations per year in English Language Arts (ELA) by the last year of the reform. Test score gains accumulated over time to about 0.6 standard deviations in math and 0.9 standard deviations in ELA for students exposed to the reform the longest.<sup>7</sup>

Second, high school students exposed to the reform experienced small but statistically significant increases in their probability of graduating from high school graduation (about 1.5 percentage points), but no statistically significant difference in their probability of attending college.

Finally, students who, as part of the reform, attended a new school, left a closing school, or moved from a closing school to a new school, tended to increase their test scores. These positive effects were small for attending a new school or leaving a closing school and slightly larger for leaving a closing school to attend a new school. In contrast, there were small negative effects on test scores for students who attended a turnaround school.<sup>8</sup>

Taken together, the report contends that the portfolio reform created as much as 27 months of additional learning as compared with observably similar students in nearby districts.<sup>9</sup> Moreover, it concludes that the reform fundamentally altered power and opportunity in Denver and is the most effective in U.S. history.

### **III. The Report’s Rationale for Its Findings and Conclusions**

The report relies on its methods (discussed more fully in Section V) to support its claims with respect to student achievement. First, to address the changing student composition in Denver concurrent with the reform (a primary criticism of the 2022 report), it limits analyses to students who were present before reform began and remained in the district throughout the reform period, until they were expected to graduate.<sup>10</sup> Second, it matches Denver Public School (DPS) students to observably similar students in nearby districts to compare changes over time from a similar baseline.<sup>11</sup> Third, it assesses relative changes over time in a “difference-in-differences” framework, comparing learning outcomes within the same student over time for reform vs. non-reform years, for DPS vs. non-reform districts, to isolate effects of reform from other changes.<sup>12</sup> Based on these methods, the report attributes student performance in Denver to the portfolio model rather than to demographic shifts.

### **IV. The Report’s Use of Research Literature**

The report only tangentially engages with relevant literature, especially that which may provide counterfactuals to its findings. At a minimum, it omits comprehensive scholarship that speaks to the potential downsides of portfolio models.<sup>13</sup>

The report draws a sharp contrast between the “portfolio model” and the traditional “unitary model” of public schooling, where a single entity governs and operates schools. It suggests that despite the rise of alternatives like charter schools and private vouchers, this unitary approach has been rarely questioned and is even defended by some as the only legitimate structure.<sup>14</sup>

The report emphasizes three main pillars of the portfolio approach in contrast: family choice, school autonomy, and accountability. Proponents argue that these reforms work in concert to improve educational equity and performance by incentivizing high-quality education across a range of providers—whether traditional public schools, charters, or other forms.<sup>15</sup>

While the report highlights the overall success of DPS’s reform in improving student outcomes, it only briefly acknowledges ongoing debates about the potential effects on low-income students and students of color. Critics question whether portfolio reforms might unintentionally exacerbate inequities by limiting access to information, transportation, or resources for these populations.<sup>16</sup>

The report engages with relevant literature but falls short in several areas. It acknowledges existing studies on portfolio reforms,<sup>17</sup> but does not engage deeply with the broader body of research on the limitations and challenges of these reforms.<sup>18</sup> For example, while the report includes citations to the theory of portfolio reform,<sup>19</sup> it does not address the political and social tensions that accompany such reforms,<sup>20</sup> including the challenges of school closures, equity in access to resources, or the logistics of student transportation.<sup>21</sup>

Similarly, the report fails to engage fully with studies that critique school closures and turn-

around efforts. Research suggests that these strategies can negatively impact student outcomes, particularly for students from low-income or marginalized backgrounds.<sup>22</sup>

A key critique of the portfolio model is its potential to exacerbate inequities, particularly for families lacking access to critical resources like transportation or information. Scholars have raised concerns about how school choice systems often favor families with more social or economic capital.<sup>23</sup> While the report acknowledges the existence of these issues, it does not grapple with the full range of inequities that might be introduced by a portfolio system, including disparities in parental engagement or access to school choice options, or address more explicitly the tensions and tradeoffs inherent in fundamentally changing the ways families and the community engage with the school system.<sup>24</sup> Overall, the report’s literature review would have been strengthened by considering the Denver experience in the context of existing literature on portfolio reform.

## V. Review of the Report’s Methods

This report’s research methods have a number of strengths and do address some of the weaknesses identified in my review of the previous report. The decision to spotlight students who were present before and throughout the reform period in both DPS and comparison districts is an effective way to isolate the effects of reform from those of demographic or compositional changes within the district over this time period, although it raises some tradeoffs discussed below. Further, while it is not without limitations and caveats, the combination of matching and difference-in-differences is a reasonably robust approach to making a causal inference.<sup>25</sup> Finally, separately examining the overall effects of reform and the effects of individual specific components of reform helps to more clearly attribute observed effects to the reform itself and to elucidate how the theory of action plays out in practice.

That said, the report grossly exaggerates the strength of its methods. That, combined with some statistical anomalies, calls into question how much of the observed gains can be attributed to reform. The report claims that the “matching process is designed to balance the student characteristics between the treated and control groups, thus mimicking a randomized experimental design,”<sup>26</sup> but this is an overstatement of what propensity score matching can do, as it can only match on observable characteristics and thus is not an appropriate substitute for a randomized design on its own. While the report transparently tests for ways that restricting the sample to those who remain in DPS may bias the results,<sup>27</sup> it fails to discuss, beyond that, the assumptions underlying any of the methods or tests for robustness to violations of those assumptions.

Most notably, the method employed to reach the report’s headline results—the large cumulative effects of reform on cohorts over several years<sup>28</sup>—is unsuitable (and simplistic) for such a comprehensive claim. This method simply sums annual test score gains over multiple years without regard for well-documented fading out of effects over time.<sup>29</sup> Additionally, overlap between tested content over grades means that subsequent annual testing results *already include* some of the residual impact from prior years. In other words, summing over these years creates double-counting of effects.

## **VI. Review of the Validity of the Findings and Conclusions**

This new report provides some additional evidence to support my 2022 conclusion that “*something* important is happening in Denver that is worthy of attention and further study.”<sup>30</sup> However, while the revised student-level methods and examination of individual aspects of the reform do address some of the critiques of the first report, many of the critiques surrounding the undertheorized nature of the reform and failure to address alternative explanations for the findings still hold. The report dismisses factors such as additional funding, reduced class sizes, and changes in leadership or curriculum concomitant with the reform. As just one example, DPS received a large infusion of external resources during the time period under study, including over \$15 million raised in 2014-15, the last year of the study period. This equates to about \$175 per student from just one source.<sup>31</sup>

The findings are incongruous in some instances. For example, the very largest effects of upwards of 0.6 standard deviation gains in math and 0.9 in ELA are called into question by their incongruity with other findings, including the small high school graduation effects and nonexistent college-going effects.<sup>32</sup> Other research has found that math and ELA effects of this magnitude would be associated with a 20% reduction in the high school dropout rate.<sup>33</sup> Thus, from the baseline graduation rate of 74.5% in 2009,<sup>34</sup> the predicted high school graduation effect based on test score gains would be at least 5 percentage points, far greater than the 1.5 percentage points that the report observes. Similarly, the fact that the aggregated reform effects are two to three times as great as those for even the most drastic individual interventions<sup>35</sup> suggests that other factors beyond the portfolio reform are at play in explaining the districtwide results.

Finally, the conclusion that this reform is the most effective in U.S. history is entirely unfounded. The report does not engage in any comparative or historical analysis.

In sum, this report provides some additional supporting evidence in favor of the tentative conclusion that Denver’s portfolio reform was positive. Importantly, the report also grossly exaggerates both the magnitude of the success and certainty behind the evidence for it. The findings should thus be interpreted with extreme caution. Further study of what was and was not working about the reform in Denver, including possible alternative explanations for these impressive outcomes and deeper investigation of their potential downsides and associated equity implications, are needed before the policy implications of this report become clear.

## **VII. Usefulness of the Report for Guidance of Policy and Practice**

This 2024 report represents a step forward from the predecessor 2022 report. However, while there is undoubtedly much to celebrate about significant academic improvements in Denver, we need to know more about the nature and mechanisms of the portfolio reform



purported to have created them, the effects of that reform on different communities and subgroups of students, and other co-occurring factors. Until we do, this report does not offer clear implications for actionable policy in other districts.

## Notes and References

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- 1 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 2). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 2 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 6). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- Tyack, D. (1993). School governance in the United States: Historical puzzles and anomalies. In J. Hannaway, Ed, M. Carnoy, Ed., & Consortium for Policy Research in Education, New Brunswick, NJ. *Decentralization and school improvement: Can we fulfill the promise?* (pp. 1-32). Jossey-Bass Publishers.
- 3 Hill, P.T. (2006). *Put learning first: A portfolio approach to public schools*. Washington, DC: Progressive Policy Institute. Retrieved October 19, 2024, from <https://files.eric.ed.gov/fulltext/ED491223.pdf>
- 4 Baxter, P., Nicotera, A., Fuller, E., Panzer, J., Ely, T., & Teske, P. (2022, December). *The system-level effects of Denver's portfolio district strategy: Technical report*. Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/research-projects-documents/center-for-education-policy-analysis/denver-report---technical-emarboed.pdf?sfvrsn=6a9745bb\\_2](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/research-projects-documents/center-for-education-policy-analysis/denver-report---technical-emarboed.pdf?sfvrsn=6a9745bb_2)
- 5 Shand, R. (2023, Feb 7). *NEPC review: The system-level effects of Denver's portfolio district strategy: Technical report (Center for Education Policy Analysis, University of Colorado Denver, December 2022)*. Boulder, Colorado: National Education Policy Center. Retrieved October 19, 2024, from [https://www.nepc.colorado.edu/thinktank/portfolio?utm\\_source=search&utm\\_campaign=nepc\\_visitors](https://www.nepc.colorado.edu/thinktank/portfolio?utm_source=search&utm_campaign=nepc_visitors)
- 6 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement*. Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 1, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 7 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 4). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 8 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 4). Center for Education Policy Analysis, University of Colorado Denver School of Public

Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)

- 9 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 28). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 10 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 3). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 11 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 17). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 12 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 23). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 13 Quinn, R. & Ogburn, L. (2020). Ideas and the politics of school choice policy: Portfolio management in Philadelphia. *Educational Policy*, 34(1), 144-165. Retrieved October 31, 2024, from <https://doi.org/10.1177/0895904819881159>  
  
Valant, J. & Lincove, J.A. (2023). Transportation inequities and school choice: How car, public transit, and school bus access affect families' options. *Educational Researcher*, 52(9), 535-543. Retrieved October 31, 2024, from <https://doi.org/10.3102/0013189X231189465>
- 14 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 6). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)  
  
Berkshire, J.C. & Schneider, J. (2024). *The education wars: A citizen's guide and defense manual*. United States: New Press.  
  
Ravitch, D. (2010). *The death and life of the great American school system: How testing and choice are*

*undermining education*. Basic Books.

- 15 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 7). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 16 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 13). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- Meltzer, E. (2023, June 14). *A researcher wants to study the effect of Denver's reform policies. The superintendent has qualms*. Chalkbeat. Retrieved October 19, 2024, from <https://www.chalkbeat.org/colorado/2023/6/14/23761289/denver-education-reform-policies-research-request-parker-baxter-study-marrero-state-board/>
- 17 Bross, W., Harris, D.N., & Liu, L. (2023). The effects of performance-based school closure and restart on student performance. *Economics of Education Review*, 94, 102368. Retrieved October 31, 2024, from <https://doi.org/10.1016/j.econedurev.2023.102368>
- Harris, D.N., & Larsen, M.F. (2023). Taken by storm: The effects of Hurricane Katrina on medium-term student outcomes in New Orleans. *The Journal of Human Resources*, 58(5), 1608-1643. Retrieved October 31, 2024, from <https://doi.org/10.3368/jhr.58.5.0819-10367R2>
- 18 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 14). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 19 Bulkley, K.E., Marsh, J.A., Strunk, K.O., Harris, D.N., & Hashim, A.K. (2021). *Challenging the one best system: The portfolio management model and urban school governance*. Cambridge, MA: Harvard Education Press.
- 20 Quinn, R. & Ogburn, L. (2020). Ideas and the politics of school choice policy: Portfolio management in Philadelphia. *Educational Policy*, 34(1), 144-165. Retrieved October 31, 2024, from <https://doi.org/10.1177/0895904819881159>
- 21 Valant, J. & Lincove, J.A. (2023). Transportation inequities and school choice: How car, public transit, and school bus access affect families' options. *Educational Researcher*, 52(9), 535-543. Retrieved October 31, 2024, from <https://doi.org/10.3102/0013189X231189465>
- 22 Sunderman, G.L. & Payne, A. (2009). *Does closing schools cause educational harm? A review of the research. Information brief*. Mid-Atlantic Equity Center. Retrieved October 19, 2024, from <https://files.eric.ed.gov/fulltext/ED543514.pdf>

- 23 Scott, J. (2013). School choice and the empowerment imperative. *Peabody Journal of Education*, 88(1), 60-73. Retrieved October 31, 2024, from <https://doi.org/10.1080/0161956X.2013.752635>
- Lenhoff, S.W. (2020). Unregulated open enrollment and inequitable access to schools of choice. *Peabody Journal of Education*, 95(3), 248-271. Retrieved October 31, 2024, from <https://doi.org/10.1080/0161956X.2020.1776072>
- 24 Pattillo, M. (2015). Everyday politics of school choice in the Black community. *Du Bois Review: Social Science Research on Race*, 12(1), 41-71. Retrieved October 31, 2024, from <https://doi.org/10.1017/S1742058X15000016>
- 25 Sant'Anna, P.H. & Zhao, J. (2020). Doubly robust difference-in-differences estimators. *Journal of Econometrics*, 219(1), 101-122. Retrieved October 31, 2024, from <https://doi.org/10.1016/j.jeconom.2020.06.003>
- 26 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 20). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 27 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 22). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 28 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 24). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 28). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 29 Bailey, D.H., Duncan, G.J., Cunha, F., Foorman, B.R., & Yeager, D.S. (2020). Persistence and fade-out of educational-intervention effects: Mechanisms and potential solutions. *Psychological Science in the Public Interest*, 21(2), 55-97. Retrieved October 31, 2024, from <https://doi.org/10.1177/1529100620915848>
- 30 Shand, R. (2023). *NEPC review: The system-level effects of Denver's portfolio district strategy: Technical report*. (p. 4). Boulder, CO: National Education Policy Center. Retrieved October 22, 2024, from <http://nepc.colorado.edu/thinktank/portfolio>

- 31 Denver Public Schools Foundation. (n.d.) *Leading the way: Your giving in action. Denver Public Schools Foundation Annual Report 2014/15*. Retrieved October 19, 2024, from [https://dpsfoundation.org/wp-content/uploads/DPSF\\_AnnualReport2015.pdf](https://dpsfoundation.org/wp-content/uploads/DPSF_AnnualReport2015.pdf)
- 32 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 29). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 30). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)
- 33 Levin, H.M. & Belfield, C.R. (2009). *Some economic consequences of improving mathematics performance*. Menlo Park, CA: SRI International. Retrieved October 19, 2024, from <https://www.sri.com/publication/education-learning-pubs/stem-and-computer-science-pubs/some-economic-consequences-of-improving-mathematics-performance/>
- 34 Colorado Department of Education. (n.d.) *Class of 2009 graduation data*. Retrieved October 19, 2024, from <https://www.cde.state.co.us/cdereval/rv2009gradlinks#:~:text=The%20graduation%20rate%20for%20the,graduation%20rate%20of%2075.0%20percent>
- 35 Baxter, P., Nicotera, A., Stuit, D., Plotz, M., Ely, T., & Teske, P. (2024, September). *Systemwide and intervention-specific effects of Denver Public Schools' portfolio district strategy on individual student achievement* (p. 34). Center for Education Policy Analysis, University of Colorado Denver School of Public Affairs. Retrieved October 17, 2024, from [https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver\\_systemwide\\_and\\_intervention-effects-technical-report-september-2024.pdf](https://publicaffairs.ucdenver.edu/docs/librariesprovider36/default-document-library/denver_systemwide_and_intervention-effects-technical-report-september-2024.pdf)